

Module Details	
Module Title	Data Structures and Algorithms
Module Code	COS5021-B
Academic Year	2021/2
Credits	20
School	Department of Computer Science
FHEQ Level	FHEQ Level 5

Contact Hours	
Type	Hours
Lectures	24
Laboratories	24 (Labs online)
Directed Study	152

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Semester 1

Module Aims
To introduce computational thinking for problem solving as core computer science knowledge that all computing practitioners are expected to know and use: to explore computational aspects of data representation and to develop familiarity with well-established and proven solutions to problems that occur frequently throughout computing and practical computing applications.

Outline Syllabus
Pseudocode. Estimating algorithm running time: complexity analysis; asymptotic order notation. Abstract Data Types. ADTs, implementations and running times for linear structures (stacks, queues, lists, hash tables), binary trees (ordered, balanced, complete), multi-way trees, graphs. Searching and sorting methods.

Learning Outcomes	
Outcome Number	Description
01	Recognise common data structures and fundamental algorithms and be familiar with the associated terminology.
02	Define Abstract Data Types in terms of their data structures.
03	Identify algorithms and demonstrate their operation and effect in solving problems.
04	Assess efficiency of various implementations and justify choice of implementation for any particular application.
05	Construct and test simple algorithms using suitable data structures, analyse the complexity and running times for algorithms.

Learning, Teaching and Assessment Strategy
As fundamental part of Computer Science, Data Structures and Algorithms are introduced for each topic by a set of exercises designed to build knowledge, promote understanding and develop problem-solving skill. For each topic lectures expose concepts and introduce material and terminology in context. Assessment is aligned to the learning outcomes. In particular, the coursework with computing exercises will reflect the learning outcomes: LO3, LO4 and LO5 by programming. The concept understanding and complexity analysis will be tested using final exam which covers all the LOs including LO1 and LO2.

Mode of Assessment			
Type	Method	Description	Weighting
Summative	Coursework	Course work (6 Computing exercises)	50%
Summative	Coursework	Report	50%

Reading List
To access the reading list for this module, please visit https://bradford.rl.talis.com/index.html

Please note:

This module descriptor has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but minor changes may occur given the interval between publishing and commencement of teaching. Upon commencement of the module, students will receive a handbook with further detail about the module and any changes will be discussed and/or communicated at this point.